**Felipe Guth - 14210231**

**I Matrix Multiplication**

//Felipe Guth - 14210231 - C Code

//to compile on linux execute the following:  gcc matrixMultiplication.c -o exec -lm

// then execute: ./exec

#include<stdlib.h>

#include<math.h>

#include<stdio.h>

#define MAX 50

//Read Matrix

void readmatrix(int Mat[MAX][MAX],int row,int col, char name[10])

{

int i, j;

printf("\n\n\       Enter the elements of Matrix  %s:\n", name);

for( i= 0; i<=row-1; i++)

for( j= 0; j<=col-1; j++)

{

printf ("\n       %s[%d][%d]:" ,name, i, j);

scanf("%d", &Mat[ i ][ j ]);

}

}

// MULTIPLICATION A X B

void multiplica (int Mata[MAX][MAX], int Matb[MAX][MAX], int ria, int colarib, int colb)

{

int i=0,j=0,k=0;

int C[MAX][MAX];

for(i=0;i<ria;i++)

{

    for(j=0;j<colb;j++)

    {

        C[i][j] = 0;

        for(k=0;k<colarib;k++)

        {

                C[i][j] = C[i][j] + Mata[i][k]\*Matb[k][j];

        }

    }

}

for( i=0; i<colarib; i++)

for( k=0; k<ria; k++)

printf ("\n Multiplication Result: C[%d][%d]=%d\n",i,k,C[i][k]);

printf("\n");

getchar();

}

main (void) //MAIN MENU \*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*\*

//Declare variables

{

    int A[MAX][MAX],B[MAX][MAX], coluarowsb=0, rowsa=0, colub=0;

    printf("\n\n       Enter the number of rows of matrix A: )");

    scanf("%d",&rowsa);

    printf("\n\n       Enter the number of columns of matrix A and rows of matrix B:");

    scanf("%d",&coluarowsb);

    printf("\n\n       Enter the number of columns of matrix B:");

    scanf("%d",&colub);

    readmatrix(A,rowsa,coluarowsb,"A");

    readmatrix(B,coluarowsb,colub,"B");

    multiplica(A,B,rowsa,coluarowsb,colub);

}

**II Dissimilarity Matrix**

//Felipe Guth - 14210231 - C Code

//to compile on linux execute the following:  gcc dissimilarityMatrix.c -o exec -lm

// then execute: ./exec

#include<stdlib.h>

#include<math.h>

#include<stdio.h>

#define MAX 10

//Read Matrix

void readmatrix(int Mat[MAX][MAX],int row,int col, char name[10])

{

    int i, j;

    printf("\n\n\       Enter the elements of Matrix  %s:\n", name);

    for( i= 0; i<=row-1; i++)

    for( j= 0; j<=col-1; j++)

    {

        printf ("\n       %s[%d][%d]:" ,name, i, j);

        scanf("%d", &Mat[ i ][ j ]);

    }

}

main()

{

    int A[MAX][MAX] = {{0}}, n=0, p=0, no=1,ne=0, aux=0, val=0,cont=0, i=0, j=0;

    float vet[MAX]={{0}}, D[MAX][MAX]={{0}};

    printf("\n\n       Enter the number of objects of : )");

    scanf("%d",&n);

    printf("\n\n       Enter the number of dimensions of each object: )");

    scanf("%d",&p);

    readmatrix(A,n,p,"A");

    //calculate the dissimilarity vector

    for(no=1;no<n;no++)

    {

        for(aux=0;aux!=no;aux++)

        {

            val = 0;

            for(ne=0;ne<=p-1;ne++)

            {

                val = val + (A[no][ne]-A[aux][ne])\*(A[no][ne]-A[aux][ne]);

            }

            vet[cont] = sqrt(val);

            cont++;

        }

    }

    //build dissimilarity matrix

    cont = 0;

    for(i=1;i<=n;i++)

    {

        for(j=0;j!=i;j++)

        {

            D[i][j] = vet[cont];

            cont++;

        }

    }

    //Show matrix

    for( i=0; i<n; i++)

        for( j=0; j<n; j++)

            printf ("\n Dissimilarity Result: D[%d][%d]= %.2f \n",i,j,D[i][j]);

    printf("\n");

    getchar();

}//end